

(c) *Test method.* (1) All Large Packagings must be placed on their base on level, hard ground and subjected to a uniformly distributed superimposed test load for a period of at least five minutes (see paragraph (c)(5) of this section).

(2) Fiberboard and wooden Large Packagings must be subjected to the test for 24 hours.

(3) Rigid plastic Large Packagings which bear the stacking load must be subjected to the test for 28 days at 40 °C (104 °F).

(4) For all Large Packagings, the load must be applied by one of the following methods:

(i) One or more Large Packagings of the same type loaded to their maximum permissible gross mass and stacked on the test Large Packaging;

(ii) The calculated superimposed test load weight loaded on either a flat plate or a reproduction of the base of the Large Packaging, which is stacked on the test Large Packaging; or

(5) *Calculation of superimposed test load.* For all Large Packagings, the load to be placed on the Large Packaging must be 1.8 times the combined maximum permissible gross mass of the number of similar Large Packaging that may be stacked on top of the Large Packaging during transportation.

(d) *Periodic Retest.* (1) The package must be tested in accordance with §178.980(c) of this subpart; or

(2) The packaging may be tested using a dynamic compression testing machine. The test must be conducted at room temperature on an empty, unsealed packaging. The test sample must be centered on the bottom platen of the testing machine. The top platen must be lowered until it comes in contact with the test sample. Compression must be applied end to end. The speed of the compression tester must be one-half inch plus or minus one-fourth inch per minute. An initial preload of 50 pounds must be applied to ensure a definite contact between the test sample and the platens. The distance between the platens at this time must be recorded as zero deformation. The force "A" to then be applied must be calculated using the applicable formula:

Liquids: $A = (1.8)(n-1) [w + (s \times v \times 8.3 \times .98)] \times 1.5$;

or

Solids: $A = (1.8)(n-1) [w + (s \times v \times 8.3 \times .95)] \times 1.5$

Where:

A = applied load in pounds.

n = maximum number of Large Packagings that may be stacked during transportation.

w = maximum weight of one empty container in pounds.

s = specific gravity (liquids) or density (solids) of the lading.

v = actual capacity of container (rated capacity + outage) in gallons.

and:

8.3 corresponds to the weight in pounds of 1.0 gallon of water.

1.5 is a compensation factor that converts the static load of the stacking test into a load suitable for dynamic compression testing.

(e) *Criterion for passing the test.* (1) For metal or rigid plastic Large Packagings, there may be no permanent deformation which renders the Large Packaging unsafe for transportation and no loss of contents.

(2) For fiberboard or wooden Large Packagings, there may be no loss of contents and no permanent deformation that renders the whole Large Packaging, including the base pallet, unsafe for transportation.

(3) For flexible Large Packagings, there may be no deterioration which renders the Large Packaging unsafe for transportation and no loss of contents.

(4) For the dynamic compression test, a container passes the test if, after application of the required load, there is no permanent deformation to the Large Packaging which renders the whole Large Packaging; including the base pallet, unsafe for transportation; in no case may the maximum deflection exceed one inch.

[75 FR 5400, Feb. 2, 2010, as amended at 75 FR 60339, Sept. 30, 2010; 78 FR 1097, Jan. 7, 2013]

§ 178.985 Vibration test.

(a) *General.* All rigid Large Packaging and flexible Large Packaging design types must be capable of withstanding the vibration test.

(b) *Test method.* (1) A sample Large Packaging, selected at random, must be filled and closed as for shipment.

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Large Packagings intended for liquids may be tested using water as the filling material for the vibration test.

(2) The sample Large Packaging must be placed on a vibrating platform that has a vertical or rotary double-amplitude (peak-to-peak displacement) of one inch. The Large Packaging must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(3) The sample Large Packaging must be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The Large Packaging must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(4) The test must be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1.6-mm (0.063-inch) in thickness (such as steel strapping or paperboard) can be passed between the bottom of the Large Packaging and the platform. Other methods at least equally effective may be used (see § 178.801(i)).

(c) *Criterion for passing the test.* A Large Packaging passes the vibration test if there is no rupture or leakage.

[75 FR 5400, Feb. 2, 2010, as amended at 75 FR 60339, Sept. 30, 2010]

Subpart R—Flexible Bulk Container Standards

SOURCE: 78 FR 1097, Jan. 7, 2013, unless otherwise noted.

§ 178.1000 Purpose and scope.

(a) This subpart prescribes requirements for Flexible Bulk Containers (FBCs) intended for the transportation of hazardous materials. FBC standards in this subpart are based on the UN Model Regulations.

(b) Terms used in this subpart are defined in § 171.8 of this subchapter.

§ 178.1005 Flexible Bulk Container identification code.

The Flexible Bulk Container code designation is BK3.

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§ 178.1010 Marking of Flexible Bulk Containers.

(a) The manufacturer must:

(1) Mark every Flexible Bulk Container in a durable and clearly visible manner. The marking may be applied in a single line or in multiple lines provided the correct sequence is followed with the information required by this section. The following information is required in the sequence presented:

(i) Except as provided in § 178.503(e)(1)(ii), the United Nations packaging symbol as illustrated in § 178.503(e)(1)(i).

(ii) The code number designating the Flexible Bulk Container design type according to § 178.1005. The letter “W” must follow the Flexible Bulk Container design type identification code on a Flexible Bulk Container when the Flexible Bulk Container differs from the requirements in subpart R of this part, or is tested using methods other than those specified in this subpart, and is approved by the Associate Administrator in accordance with § 178.1035;

(iii) The capital letter Z identifying that the Flexible Bulk Container meets Packing Group III performance standard under which the design type has been successfully tested.

(iv) The month (designated numerically) and year (last two digits) of manufacture;

(v) The country authorizing the allocation of the mark. The letters “USA” indicate that the Flexible Bulk Container is manufactured and marked in the United States in compliance with the provisions of this subchapter.

(vi) The name and address or symbol of the manufacturer or the approval agency certifying compliance with subpart R and subpart S of this part. Symbols, if used, must be registered with the Associate Administrator.

(vii) The stacking test load in kilograms (kg). For Flexible Bulk Containers not designed for stacking the figure “0” must be shown.

(viii) The maximum permissible gross mass in kg.

(2) The following is an example of symbols and required markings for a Flexible Bulk container suitable for stacking; stacking load: 1,000 kg; maximum gross mass: 2,500 kg.